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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|-------------------------------------|------------------|
| 10/631,220 | 07/30/2003 | Richard T. Howard | MFS-31843-1 | 3295 |
| 30698 | 7590 | 09/08/2005 | | |
| NASA/MARSHALL SPACE FLIGHT CENTER LSO1/OFFICE OF CHIEF COUNSEL MSFC, AL 35812 | | | EXAMINER KALIVODA, CHRISTOPHER M | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2883 | |

DATE MAILED: 09/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-------------------------------------|---|--|
| Office Action Summary | Application No. 10/631,220 | Applicant(s) HOWARD, RICHARD T. (m) | |
| | Examiner Christopher M. Kalivoda | Art Unit 2883 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE filed 07/18/2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 6, 7-11, 13 and 15-17 is/are rejected.
- 7) ☒ Claim(s) 3, 5, 12 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4, 6, 7, 11, 13 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krivoshlykov, U.S. Patent 5,751,871.

Regarding independent claims 1 and 7 as claimed, Krivoshlykov teaches:

an input end for receiving the beam of light (Fig 5, left end of fiber whose end face is 51);

and an exit end (Fig 5, ref sign 51) for projecting the beam of light towards the target (col 6, lines 16-19); said exit end having a major axis (major axis of fiber end);

wherein the exit end has at least one diffractive optical pattern formed thereon (Fig 5, cone shaped diffractive element formed on fiber's end), wherein said optical pattern comprises means for providing an even illumination pattern across the target (col 6, lines 21-23), wherein said illumination pattern has a major axis (Fig 5, ref sign 55-57) greater than said major axis of said exit end.

The fiber's cross-section is implied to be circularly symmetric since typical fiber diameters (a term naturally associated with circles) are disclosed. As such, the projected pattern would also be circular. Since circular shapes are implied, the major and minor axes are the same.

Regarding claims 3 and 11, the diffractive pattern can be formed by cutting (col 7, lines 17-20).

Regarding claims 4 and 13, the diffractive optical pattern is continuous since the shape is conical (Fig 5, ref sign 51).

Regarding claim 6, the optical fiber is coupled to a laser emitting diode at the input end (col 3, last 2 lines and col 4, lines 1-3).

Regarding claims 15 and 16, the fiber can be multimode (col 5, lines 23-24).

Regarding claim 17, the major axis of the illumination pattern has a length at least three times the length of the major axis of the exit end (Fig 5, ref sign 51 and extending lines 52-53 to screen and comparing dimensions).

Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krivoshlykov, U.S. Patent 5,751,871 in view of "The Video Guidance Sensor – A Flight Proven Technology" by Howard et al.

Regarding claims 8-10, Krivoshlykov teaches the limitations of the claims as described above.

However, the reference is silent with respect to a rectangular illumination pattern on the target, a plurality of laser emitting diodes and a respective plurality of fiber optics and the exit end of the fiber optics arranged in a circular fashion around a camera.

Howard et al. teach in their publication a rectangular illumination pattern (Fig 5) on the target, a plurality of laser emitting diodes and a respective plurality of fiber optics and the exit end of the fiber optics arranged in a circular fashion around a camera (page 3, lines 7-10 and Fig 1).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to use the fiber of Krivoslykov in the camera of Howard et al.

The motivation is to efficiently couple beams from a laser diode into an optical fiber (col 1, lines 10-12).

Allowable Subject Matter

Claims 3, 5, 12 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 3 and 12, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical fiber with an exit end and a diffractive optical pattern formed thereon wherein the diffractive optical pattern is one of a binary or multilevel diffractive pattern in combination with the limitations of the base claim.

Regarding claims 5 and 14, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical fiber with an exit end and a diffractive optical pattern formed thereon having a plurality of optical diffractive patterns incorporated thereon.

Conclusion

Any inquiry concerning this communication or earlier communications from the

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examiner should be directed to Christopher M. Kalivoda whose telephone number is (571) 272-2476. The examiner can normally be reached on Monday - Friday (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



CMK
09/02/05



**KAVEH KIANNI
PRIMARY EXAMINER**